MOBILE ROAMING & RATE REGULATION: AN ECONOMIC ANALYSIS

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I. INTRODUCTION

The Federal Communications Commission is considering whether to regulate roaming agreements, now largely unregulated.[2] These contracts allow subscribers of one mobile phone carrier to seamlessly use the physical network of another carrier, just by normally operating their handset to make, receive, or continue a call in a particular geographic area. Terms are pre-negotiated by carriers.

Literally hundreds of such contracts have been executed; Cingular Wireless alone has over 100 roaming agreements with domestic carriers[3] and has entered into international roaming agreements in more than 165 countries for voice and more than 85 countries for data.[4] These agreements allow Cingular to offer its customers better quality service, including wider network coverage and reduced transaction costs.

The convenience and value provided by seamless network coverage have become an essential competitive margin. Rival carriers attract customers only when the bundle of services offered – including wide area use of their telephones – is seen as superior, dollar for dollar, to alternatives. Conversely, each network owner strives to increase traffic, selling access to both retail customers and other carriers so as to amortize capital investments and realize profits. Networks capture gains from trade in entering roaming agreements, and in buying and selling wireless access.

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[2] Federal Communications Commission, *In the Matter of Reexamination of Roaming Obligations of Commercial Mobile Radio Service Providers*, WT Docket No. 05-265, Memorandum Opinion and Order and Notice of Proposed Rulemaking, FCC 05-160 (Rel. Aug. 31, 2005).

[3] *Comments of Cingular Wireless LLC*, WC Docket No. 05-265 (Nov. 18, 2005), p. 11.

[4] *HP and Cingular Announce Complete Wireless Solution on HP iPAQ Mobile Messenger*, BUSINESS WIRE (Oct. 18, 2005).

The wireless marketplace has produced striking results, both in the complexity of the organizational structures created and in the generation of consumer benefits. Wireless carriers offer services and applications requiring the cooperation of scores of different suppliers, including that of the owners of distant mobile phone networks. This bundle is packaged so that customers easily access what they demand, at affordable prices. The efficiency of this regime is suggested by the phenomenal growth in virtually every dimension of output, from subscribers, to minutes of use, to diversity of applications.

An argument is being made by some, however, that the outward signs of pro-consumer success mask a deeper anti-competitive problem.[5] While the wireless market has at least four national carriers, and is seen to be competitive by the FCC,[6] the wholesale market is alleged to be highly concentrated within each technology. Under this theory, a small rural wireless carrier using CDMA technology and seeking roaming agreements with national carriers is limited to dealing with (CDMA networks) Sprint or Verizon; a carrier using a GSM standard is limited to (GSM compatible) Cingular or T-Mobile. This more concentrated wholesale market structure, it is argued, allows nationwide systems to "foreclose" the small wireless carrier by charging prices that are prohibitively expensive.[7] The alleged gain to the large carrier is that the small carrier can no longer compete in offering nationwide service, as its customers are unable to roam.

The argument is demonstrably incorrect, both theoretically and empirically. The theory is based on the premise that prices should be based on incremental costs, and that where prices deviate from such costs anti-competitive outcomes obtain. This is false. Given the characteristics of a modern wireless network, including substantial sunk capital costs and low to non-existent marginal costs (up to capacity utilization), efficient pricing is not marginal cost-based. In addition to covering marginal costs, operators must recover significant fixed costs. Consequently, it is efficient for operators to implement multi-part pricing where some usage is at low (or zero) prices, and some at much higher per-minute rates, while simultaneously imposing recurring fixed charges or, similarly, quantity commitments – the pricing regime that has spontaneously developed in mobile phone markets. The fee schedule by all mobile phone operators deviates substantially from the "cost-based" pricing suggested by proponents of regulation, including those submitting such proposals for wholesale rate regulation.

Further, the theory never explains how the alleged wholesale market power translates into consumer harm in the admittedly competitive retail market. Anti-competitive foreclosure of new

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[5] See ERS Group, *Wholesale Pricing Methods of Nationwide Carriers Providing Commercial Mobile Radio Service: An Economic Analysis* (Nov. 28, 2005), filed by Leap Wireless, *Comments of Leap Wireless International, Inc.*, WC Docket No. 05-265, (Nov. 28, 2005) ["ERS 2005"]. See also Preston McAfee, *The Economics of Wholesale Roaming in CMRS Markets* (Nov. 28, 2005), filed by Southernlinc, *Comments of Southernlinc Wireless*, WT Docket No. 05-265 (Nov. 28, 2005) ["McAfee 2005"].

[6] "Using the various data sources and metrics discussed above, we have met our statutory requirement to analyze the competitive market conditions with respect to commercial mobile services, and conclude that the CMRS marketplace is effectively competitive." *Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services*, WT Docket No. 05-71, *Tenth Report*, FCC 05-173 (Rel. Sept. 30, 2005) pp. 77-78.

[7] "…[N]ationwide carriers' pricing decisions are in no way connected with their costs, as would be expected in a competitive environment; rather, rates are most likely being driven by the incentive to foreclose regional carriers from entering the market." ERS Group 2005, pp. 2-3. See also McAfee 2005, p. 3.

entrants is a losing strategy for a CDMA carrier or a GSM carrier (or an iDEN, TDMA, or AMPS carrier). That is because the foreclosing carrier would be sacrificing revenues, and thereby profits, by selling fewer wholesale minutes only to *expand rivals' market shares*. This is the direct implication of the FCC's determination that retail wireless phone markets are effectively competitive.

Empirically, CDMA, GSM, and iDEN networks are observed to compete vigorously not only in the retail market, making foreclosure moot, but also in the wholesale market. National carriers negotiate hundreds of roaming agreements with partners, competitors, and independent carriers, a curious way to exercise "foreclosure." Moreover, they sell billions of minutes annually to Mobile Virtual Network Operators (MVNOs), an important aspect of retail market structure, and a metric on the plausibility of wholesale market foreclosure that is wholly ignored by proponents of regulation.

Just as a small wireless carrier may wish to buy wireless access on far-flung local networks, MVNOs contract for wholesale services and now serve about 12 million U.S. subscribers.[8] Rather than foreclose retail services, national wireless networks are in hot pursuit of new MVNOs to increase network utilization. Competition drives this, and the revenues extracted from additional traffic fund technology upgrades that keep networks viable relative to the alternatives facing (retail) customers.

Some parties further request that the FCC mandate roaming rates, with rules that permit small wireless carriers to access large national networks at rates based on retail prices minus some calculation of costs. The calculations performed are flawed, but a more fundamental problem is that any price control regime eliminates a rich source of efficiency: the process whereby networks voluntarily negotiate roaming terms. In arranging such agreements, carriers not only discover rates that efficiently promote productive contributions by both parties, but also help coordinate quality service. Indeed, roaming agreements typically contain volume pricing incentives or quantity guarantees, helping to support investments in network infrastructure. Contracts further establish quality-of-service (QoS) norms, including those relating to customer service and technology standards. The process wherein firms find common ground to cooperate in the provision of roaming services has produced essential components of the consumer welfare gains now evident in the U.S. mobile phone market. Imposing politically determined price controls wipes away this rich source of efficiency, multiplying risks faced by investors and thereby reducing capital outlays, while undermining cooperative efforts to upgrade service and reliability for consumers. The argument for regulation simply ignores these social losses.

This paper begins with an overview of the wireless sector, focusing on market forces that have delivered increasingly efficient outcomes. These include the extension of network coverage, services, and applications, along with dramatically increased minutes of use in the face of rapidly falling retail prices.

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[8] "Virtual networks generate about $3.5 billion in annual revenue from about 12 million subscribers in a country of 200 million cell phone users." Ryan Kim, *Battle Rages for the Luxury Phone Market; Virtual Networks Go after High-end Mobile Customers*, SAN FRANCISCO CHRONICLE (Jan. 2, 2006) at http://www.sfgate.com/cgi-bin/article.cgi?file=/c/a/2006/01/02/PHONE.TMP&type=printable (accessed on January 20, 2006).

The paper then explains the economics of roaming. Carriers large and small find mutual advantage in pre-contracting for minutes for their customers, and arrange hundreds of agreements in voluntary negotiations. Absent market power in retail markets, consumers freely substitute away from networks that engage in anticompetitive conduct. The argument for regulation, briefly summarized above, is then dealt with in more detail. It fails to present either a theoretical or empirical case that regulation of roaming markets would enhance consumer welfare.

II. THE DEVELOPMENT OF U.S. MOBILE TELEPHONE SERVICE

Mobile telephony is the "killer app" of the wireless sector, a stunningly valuable service that is rapidly eclipsing legacy fixed line networks. Today, over 200 million Americans use wireless phones,[9] annual revenues (for service alone) top $102 billion,[10] and at least another $150 billion in consumer surplus is estimated to result each year.[11] This industry has developed into an essential component of the U.S. economy despite a federal licensing policy that radically disaggregated operators' franchise areas, requiring thousands of market transactions to cobble together seamless nationwide phone service – a highly demanded attribute of mobile service.

Competitive processes have extended nationwide phone access to subscribers via a complex web of mergers, joint ventures, partnerships, and privately executed roaming agreements. These contracts are unregulated. In 1995, the FCC elected to forbear from regulating roaming agreements on three grounds.[12] First, there was insufficient evidence to document the existence of a market failure. Given more time, newly licensed PCS operators could well succeed in negotiating agreements.[13] Second, to the extent theoretical problems identified by the proponents of regulation ever materialize, they were expected to be simply transitional during the five-year build-out provided for PCS licenses. Once these PCS markets were constructed, market forces would remedy limitations faced by entrants.[14]

Third, although not explicitly stated by the FCC, the advantages of market negotiations over government regulation loomed large. With roaming contracts, parties mutually agree, and separately benefit. This ensures that *network usage* (by roaming customers using another network by agreement) and *network building* (sinking capital to construct new facilities or to deploy advanced technologies in the expectation of future benefits) simultaneously advance. Network owners desire to utilize their systems when access payments exceed marginal costs, while aiming for long-term recoupment of capital investments. Network users understand that

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[9] As of Jan. 25, 2006, there were an estimated 202,455,067 wireless phone subscribers in the United States. Website of CTIA – The Wireless Association, www.ctia.org.

[10] See CTIA's Semi-Annual Wireless Industry Survey (2004).

[11] "We estimate that the U.S. wireless services generated a consumer surplus of $157 billion per annum at the end of 2004". See Roger Entner and David Lewin, *The Impact of the US Wireless Telecom Industry on the US Economy, A Study for the CTIA-The Wireless Association,* OVUM (Sept. 2005), at p. 27.

[12] Federal Communications Commission, *In the Matter of Interconnection and Resale Obligations Pertaining to Commercial Mobile Radio Service,* CC Docket No. 94-54, Second Report and Order and Third Notice of Proposed Rulemaking (Rel. Aug. 13, 1996).

[13] Ibid.

[14] Ibid, ¶ 2.

paying marginal costs for access, where substantial network outlays are irreversibly sunk, is not a viable option. They are forced to offer, and competitive network owners are competitively pressured to accept, payments that efficiently compensate costs. In wireless phone networks, with high upfront sunk investment and low or zero marginal cost of usage up to capacity, these agreements encompass multi-part pricing, quantity guarantees, and quality-of-service provisions. The result of market competition is a complex web of negotiated contracts that furthers the interests of consumers by efficiently creating valuable infrastructure and rationally apportioning access, while collecting payments to support viable long-term services.

The FCC decision to forbear has helped to produce near spectacular results. Entry by PCS providers, unregulated roaming agreements, and continued geographic consolidation by merger and contract have dramatically improved network services and slashed retail prices.[15]

The efficiency of large geographic scope is clear: uniform national service is valuable. This point is made by virtually all of the commenters in the current proceeding.[16] It is a point also recognized by the FCC:

> The Commission has concluded previously that operators with larger footprints can achieve certain economies of scale and increased efficiencies compared to operators with smaller footprints. Such benefits, along with advances such as digital technology, have permitted companies to introduce and expand innovative pricing plans such as digital-one-rate ("DOR") type plans, reducing prices to consumers.
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> Since the end of 1999, carriers have been building nationwide footprints through various forms of transactions. One of the driving forces behind many of these transactions has been the desire of large regional carriers to enhance their ability to compete with existing nationwide operators that offer attractive nationwide pricing plans. More recently, national operators have sought to fill in gaps in their coverage areas.[17]

The rise of national networks can also be seen in the fall in the relative share of roaming. Figure 1 shows roaming calls and roaming minutes as a percentage of total calls and total minutes, respectively. As networks grow, less area is out of network and subject to roaming.

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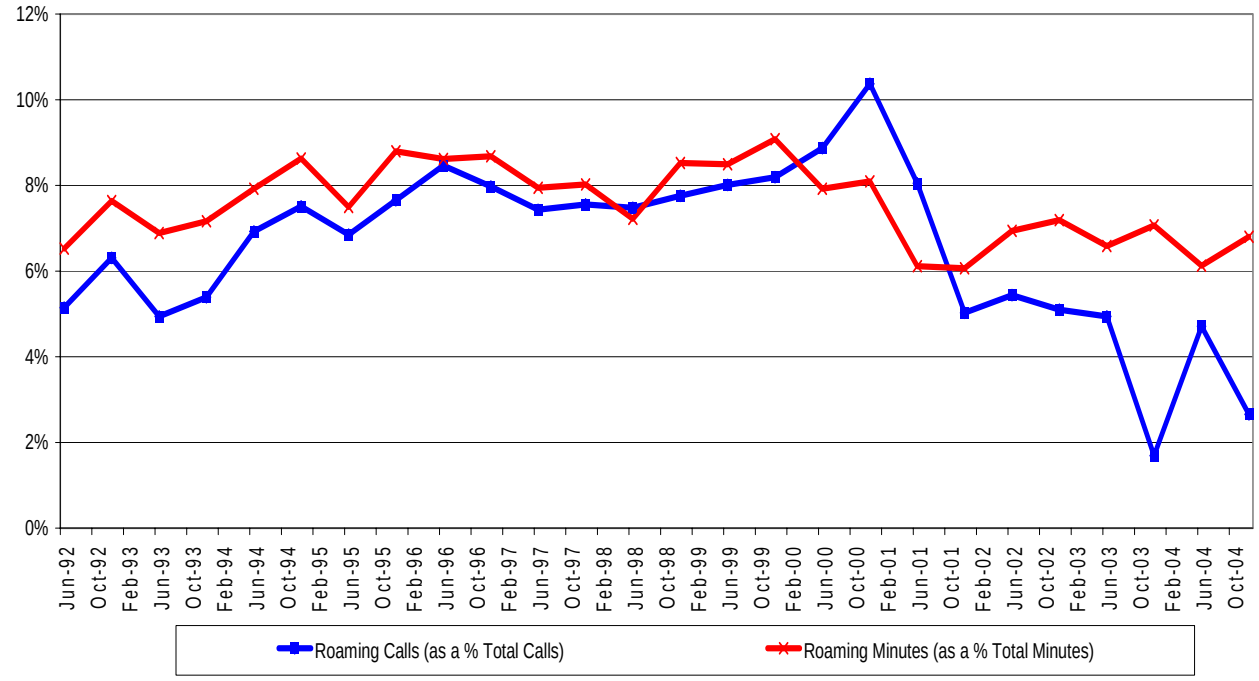
[15] Thomas W. Hazlett, *Is Federal Preemption Efficient in Cellular Phone Regulation?* 56 FEDERAL COMMUNICATIONS LAW JOURNAL 155 (Dec. 2003) ["Hazlett 2003"].

[16] "Like many subscribers of local mobile wireless service, however, some of Leap's customers need the flexibility of using their mobile wireless service when they travel—not only for convenience but for the added safety they can obtain through ready access to mobile phone service when they are away from their home market." *Comments of Leap Wireless International, Inc.*, WT Docket No. 05-265 (Nov. 28, 2005), p. 5. "Because customers increasingly demand the ability to use their wireless services as they travel outside their home carriers' networks, carriers have responded with service plans that allow customers to roam onto other carriers' networks." *Comments of Verizon Wireless*, WT Docket No. 05-265 (Nov. 28, 2005), p. 2.

[17] *Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, Seventh Report*, FCC 02-179 (Rel. July 3, 2002), pp. 13-14 (footnotes omitted).

FIGURE 1: ROAMING CALLS (AS % OF TOTAL CALLS) AND ROAMING MINUTES (AS % OF TOTAL MINUTES)

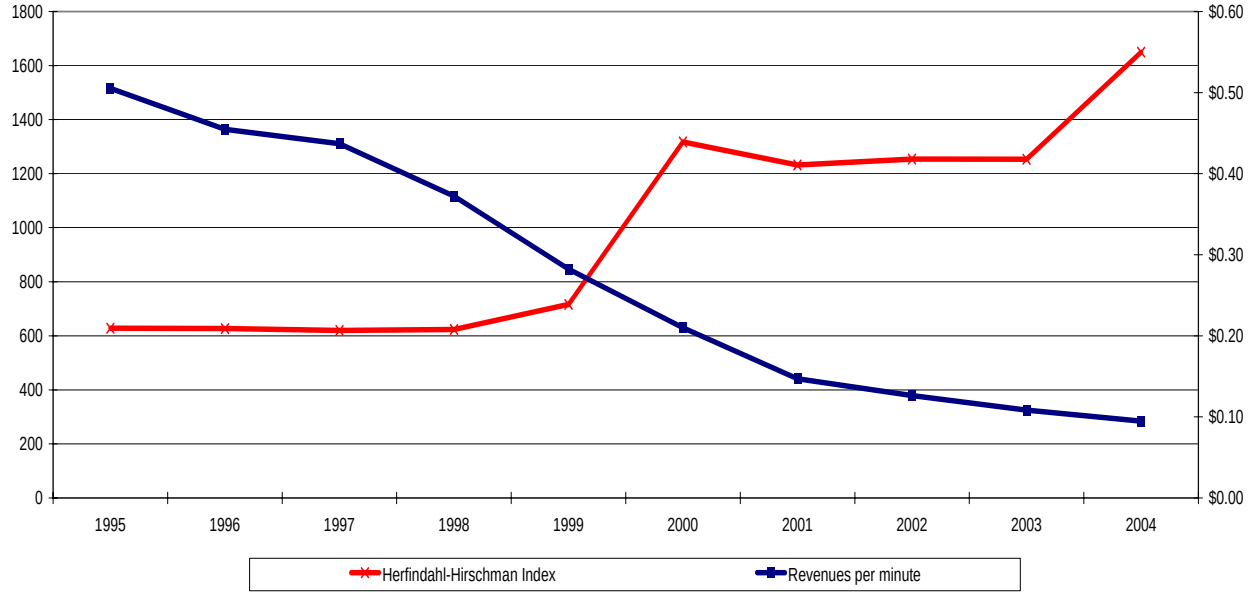


CTIA's Semi-Annual Wireless Industry Survey, 2004.
Roaming Calls as a percentage of total calls calculated as Number of Billable Roamer Calls divided by Total Billable Calls. Roaming calls do not include prepaid calls.
Roaming Minutes as a percentage of Total Minutes calculated as Number of Billable Roamer Minutes divided by Total Billable MOUs. MOUs do not include prepaid calls.

The rise of national networks can be seen as an increase in concentration in the mobile phone market, depending on how that is measured, but it then must be seen as associated with *lower* retail prices. If concentration is measured on a national basis (rather than market by market, which is the standard method), increases in concentration are evident just as phone rates plummet. See Figure 2. This evidence suggests consumers substantially benefit from the change in market structure.[18]

[18] Concentration is measured here by the Herfindahl-Hirschman Index (HHI). The HHI is the sum of the firm market shares squared $= \sum_{1}^{n} ms_i$, where "n" is the number of firms and "ms" is the market share of individual firms. This analysis differs from the standard approach to industrial concentration, deriving shares from total (nationwide) sales. The standard way to judge competition in service markets is to derive an HHI in each local market, and aggregate (or average) from there. The purpose here, however, is to observe the consolidation of geographically dispersed networks.

FIGURE 2: WIRELESS MARKET CONCENTRATION (BY SUBS) AND AVERAGE REVENUES PER MINUTE (1995 – 2004)



CTIA's Semi-Annual Wireless Industry Survey, 2004.
FCC Annual Reports and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services.
Revenues per minute defined as Services Revenues per year in $US divided by Total MOUs. Revenues include long distance (toll) revenues starting in 1999.

III. MARKET POWER AND ROAMING AGREEMENTS

The argument for government regulation of roaming agreements relies on the assumption of market power in the wholesale market. It is alleged that, no matter the degree of competition for retail mobile phone services, carriers seeking roaming agreements are limited in their choices due to technological lock-in and that this creates anti-competitive opportunities for wholesalers. A small carrier seeking nationwide roaming capability is said to face, essentially, a wholesale duopoly (or monopoly), given the necessity of using compatible networks. Further, it is argued, the national networks use this duopoly or monopoly power to "foreclose" new nationwide entrants, denying small wireless carriers roaming agreements (or offering them on prohibitively expensive terms) in order to secure larger market share and additional profits.

The rationale for regulation fails both theoretically and empirically. We take the arguments in order.

1. *The Theoretical Argument for Anti-competitive Conduct.*

a. Wholesale prices diverge from carriers' costs.

To establish that national wireless carriers inefficiently price wholesale access to their networks, the advocates of regulation introduce evidence that per-minute rates exceed incremental costs and vary across classes of purchasers. The assumption is that, in a competitive market, prices will converge to marginal costs. This will both eliminate price variance, and result in zero economic profits. The ERS paper states plainly, that "nationwide carriers' pricing decisions are in no way connected with their costs, as would be expected in a competitive environment."[19]

This approach to pricing falls prey to what William Baumol recently warned about in a lecture entitled, "How Regulators Can Be Misled by Simplistic Theory."[20] When unit prices are seen to diverge from each other and (presumably then) from marginal costs, the conclusion that a prima facie case for regulation exists has led to perverse results. Prof. Baumol's analysis has been summarized as follows:

> In the 2005 AEI-Brookings Joint Center Distinguished Lecture, Professor William Baumol of New York University shows how regulators can be misled by oversimplified economic theory. For example, it is generally recognized that perfect competition is an artificial construct that rarely is approximated in reality. Yet it is sometimes treated as an appropriate guide to regulators, threatening to yield damaging rules. Since discriminatory pricing is incompatible with perfect competition, such prices are said to prove monopoly power. Yet many markets with discriminatory prices are very competitive. Baumol shows that effective competition does not impose uniform prices and demonstrates a stronger result: Where competitive pressures prevail, they can force all firms to adopt discriminatory prices if consumer arbitrage is difficult. This radically different picture of competitive markets helps to explain the near ubiquity of discriminatory pricing in reality and indicates limits to the use of discriminatory pricing as a justification for regulatory intervention. [21]

The conclusion is simply incorrect that prices must be uniformly set at incremental cost for efficiency to obtain. The thought that they should, on the contrary, stems from an inapt application of the concept of "perfect competition" to real world markets.

Indeed, the ERS paper specifically notes that price discrimination practiced by wireless networks necessarily implies "market power," on the grounds that "[i]n a perfectly competitive market, prices are necessarily uniform."[22] Yet, in a perfectly competitive market, *all resources are perfectly mobile*; that is to say, there exist no irreversible investments. To apply the model of perfect competition to the wireless telephone market, where substantial network investments are essential to efficiently supplying services, imposes an entirely improper framework. When wireless markets cannot be squeezed into the theoretical box of perfect competition, uneconomic policy proposals result.

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[19] ERS Group 2005, p. 2.

[20] *AEI-Brookings Joint Center 2005 Distinguished Lecture* (Sept. 22, 2005), at http://aei.brookings.org/events/page.php?id=147 (accessed on January 18, 2006).

[21] Ibid.

[22] ERS Group 2005, p. 15.

In a market involving substantial sunk costs, it is necessary that investors expect to recoup outlays. In practice, the pro-consumer means of doing so will involve a variety of prices and contractual relations, and will *never* result in a rule setting prices uniformly equal to marginal costs. This would result in financial ruin for investors, deterring the creation of valuable assets. Alternatively, social gains are realized when such opportunities are brought into the market and financed by menus that provide a range of per-unit prices.

Indeed, firms with substantial sunk assets are *competitively constrained* not to uniformly price at marginal cost, but to capture higher increments of support from inelastic customers while extending lower-priced bargains to elastic buyers. Often, other non-linear pricing arrangements appear, including contractual terms that help enlist support for the fixed investments undertaken by the supplier.

Identifying such practices as anti-competitive conduct can be an egregious error. The danger is that policy makers, mistaking efficient pricing schemes as anti-consumer, impose rules that make consumers worse off. This risk is seen in the application to enlist regulation of mobile roaming rates. Imposing per-minute access terms for wholesale users who shoulder no contractual obligations, no commitments for purchase quantities, and no cooperative investments may allow such users to free-ride on sunk investments, discouraging such undertakings and deterring network infrastructure creation.

The policy proposal put forward by advocates for regulation is instructive. Focusing upon some prices charged by national wireless networks while ignoring others, the proposal selects per-minute rates that are said to approximate the costs of the networks when certain avoided expenses are subtracted. No accounting is made for the gains to network owners in enlisting support for irreversible investment, commitments that are extensive in the contracts routinely executed between carriers or between networks and MVNOs. This obscures the crucial role played by risk, and the market forms that attempt to limit variances, in the creation of network assets.

The proposal is then fashioned to allow rural wireless carriers to purchase minutes of roaming service, wholesale, at these per-minute retail prices minus certain retail costs, claimed to be in the range of 2.3¢ for T-Mobile to 4.3¢ for Sprint.[23] An alternative policy is also recommended: a "requirement that the wholesale rates not exceed retail rates…"[24] These are calculated to range between "$0.05 per minute for Verizon Wireless to $0.0683 for Cingular."[25]

Yet, if "the cap should be set by the lowest prevailing retail rates for a particular area," as is also suggested,[26] a different result would obtain. Regional wireless carriers could claim the right to buy minutes for near-zero prices, which are available for some market segments during

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[23] ERS Group 2005, p. 13.

[24] "The requirement that the wholesale rates not exceed retail rates only limits the ability of nationwide carriers to exercise market power to earn excess returns and to undermine competition." McAfee 2005, p. 17.

[25] ERS Group 2005, p. 19.

[26] "Where audited information is not publicly available about average retail rates, the cap should be set by the lowest prevailing retail rates for a particular area." ERS Group 2005, p. 24.

some time periods and for some applications. Subsequently, network owners would have the incentive to raise such prices so as to avoid appropriation. Efficient targeting of elastic demanders would be deterred, and network usage restricted – predictably the anti-competitive outcome now claimed, without empirical evidence, to emanate in wholesale roaming markets.[27]

Granting options to buy wireless minutes in a spot market invokes considerable collateral issues. The costs of providing the wireless network are pointedly *not* incurred on a per-minute basis, and the efficient recoupment of irreversible investments calls for pricing schedules that do not offer lowest prices to those who make no commitment to support the network. This is seen in the competitive retail pricing of wireless minutes for pre-paid and post-paid subscribers, as well as in the various "bucket" plans offered. Subscribers who make larger commitments to fund the network are allowed to use more minutes at lower per-minute prices. "Unbundled" minutes cost substantially more for pre-paid customers who have no contract with their network service provider, but enjoy maximum flexibility, compared to subscribers who enter long-term commitments at higher usage levels. Likewise, the prices charged subscribers for unbundled minutes over the contracted bucket of minutes are higher than the average per-minute price for minutes in the bucket. These pricing differentials are not explained by "marginal cost," but they are explained as an efficient mechanism for recouping fixed investments. Demanders willing to commit more support are rewarded with greater access to facilities at lower per-unit prices.

Hence, the access prices discussed in both the ERS and McAfee papers are truncated in a curious way. Considering only the peak (anytime) minutes of major monthly nationwide calling plans, produces a price claimed to approximate the competitive level.[28] Yet many retail rates are today $0.00/minute, which approximates marginal costs in situations where customer relationship costs have been sunk and unused network capacity exists. Subscribers are offered free off-peak minutes, on-net minutes, or text messaging. But it would be highly misleading to describe this as an offer to price access at $0.001 per minute (the approximate per minute charge spreading a $40 monthly payment continuously over 30 days), because the contractual relationship sets forth a vector of important constraints. Among these are *minimum* quantity guarantees (implicit in the monthly subscription fee) and *maximum* quantity limits (bounding the extent of the marginal cost offering, allowing the network to recoup sunk costs elsewhere).

In sum, the observation that per-minute prices for wireless phone service vary is correct, but the implication – that it demonstrates the lack of competitiveness in the market – is false. That should be clear given that both the ERS paper and the McAfee paper concede that the retail CMRS market is competitive. Mobile phone subscribers face a broad range of prices and service contract options. These pricing schedules are competitive outcomes, not anti-competitive stratagems, that signal an attempt to recoup total network costs in the most efficient fashion.

b. Foreclosure.

Assume, for the sake of this discussion, that all the facts alleged by the proponents of roaming regulation are correct, and that the paradigmatic situation involves a small rural wireless

[27] ERS Group 2005, p. 19.

[28] "Quite simply, a carrier's wholesale roaming rates in a region should not exceed its lowest prevailing retail rates in that region." McAfee 2005, p. 5.

carrier seeking to buy wholesale minutes from a nationwide wireless carrier which serves distinct (and far larger) geographical markets. Even under these circumstances, the foreclosure theory advanced is logically deficient. It states that nationwide carriers use their market power in wholesale markets to block competitive entry, yet the argument states no instance of entry being attempted in the *wholesale market*. The roaming agreement adds no wholesale network facilities. Indeed, offering low-priced network usage agreements has been seen as a method of *discouraging* investments in new network facilities, lowering incentives for entrants to build their own systems.[29] This is precisely what has been observed (reversing the parties) in the expansion of nationwide wireless networks:

> Between 1995 and 1998, roaming revenues accounted for 10-15 percent of all wireless revenues. The high roaming rates pushed carriers to expand their national networks, and increased competition among the national carriers began to place downward pressure on roaming rates and revenues. In 1998 the share of roaming revenues in total revenues began to decline, and by 2003 it had fallen to about 4 percent of revenues.[30]

The argument for regulation, while premised on alleged market power in wholesale markets, claims that this power is used to block entry into highly competitive retail markets. It posits that "duopoly" networks profitably refuse to grant reasonable roaming terms to small rural carriers that would then offer end customers (wireless phone users) the ability to use the nationwide carriers' own networks, intensifying direct competition for subscribers.[31] But the foreclosure alleged is not a rational economic strategy for two reasons. First, the retail market is competitive, as held by the FCC and as acknowledged by parties advocating regulation. To forego a contract with an efficient retail service provider, one which will pay the network owner receipts in excess of its costs, a network sacrifices profits in order to create benefits that will accrue to its rivals. Either in the wholesale market, where the duopolistic competitor may offer the efficient contract, or in the retail market, where several competitive options exist, the *output restriction* attempted would be met by rivals' *output expansion*. If the network owner cannot itself restrict output to drive up price in the retail market, the sine qua non of a competitive market structure, it cannot implement this strategy by restricting resale of its network (e.g., by a small rural wireless carrier seeking a roaming agreement). Because the retail market is highly competitive, either form of output restriction fails.

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[29] Marc Bourreau and Pinar Dogan, *"Build or Buy" Strategies in the Local Loop*, paper presented at the Allied Social Science Associations Annual Meetings in Boston, Massachusetts (Jan. 7, 2006).

[30] Robert W. Crandall, *Competition and Chaos*, (Brookings Institution Press, 2005) ["Crandall 2005"], p. 97.

[31] "Wholesale markets for CMRS roaming services are in many places monopolies or duopolies. The four nationwide carriers, who are the monopoly and duopoly wholesale providers, employ anti-competitive pricing policies, often charging wholesale per minute rates significantly more than they charge their own retail customers. These practices occur despite the fact that, on average, wholesale minutes are less costly for carriers to provide. Such practices are clearly carried out with the intent of restricting output and raising costs of unaffiliated regional competitors. Some consumers are harmed by these wholesale practices, as regional providers offer services, features, and rate plans not offered by the nationwide operators. Current wholesale pricing practices of the nationwide carriers make actual and potential customers of those regional carriers choose between those services and roaming." McAfee 2005, p. 16.

Second, were a roaming agreement between the large and small carriers to be consummated, the market power alleged to reside in the wholesale market would remain undisturbed. The resale of minutes for roaming customers leaves the structure of the wholesale market intact, and therefore the alleged pricing power of the incumbents. Denying the small wireless carrier access to roaming minutes on the large nationwide network does not change wholesale market structure and, because the retail market is competitive to begin with, does not materially change retail market structure. In short, the national carrier with market power in the wholesale market is not incented to foreclose retail entry. There is nothing gained, while revenues (and profits) are lost.

Wireless carriers negotiate roaming agreements in bilateral bargaining. Large national carriers and small rural carriers both supply and demand roaming minutes. They supply access to reap returns on their investments in network infrastructure, which typically yield large capacities that give them inventories for sale to both their own retail customers and to other (wholesale customer) carriers. Conversely, both types of carriers demand minutes to extend the reach of their geographic coverage, and so increase the functionality of their service to customers.

Take the case of a national carrier selling minutes to a small rural carrier. There is a range of possible terms (an infinite set of complex contracts with multiple dimensions, in fact). Bargaining will focus on the efficient range, where there are gains from trade, and resolve how gains are distributed between the parties. If the national carrier refuses to offer an efficient contract to the rural carrier, it can arguably reduce the number of retail carriers offering nationwide roaming service (assuming that the rural carrier is unable to strike a deal with another wholesale network). The national network has now reduced the utilization of its network, sacrificing wholesale profits, on the strategy that it will more than offset these losses in the retail market. But the retail market is competitive, and the under-utilization of the one network will predictably incent other retail and wholesale networks to expand their output. This is true across technologies; the under-performance of the "foreclosing" national network is analogous to a restriction of output in the retail market. But output restriction in competitive markets is a losing proposition precisely because one's rivals free ride on the profits sacrificed.

In sum, foreclosing retail competition by sacrificing efficient wholesale contracts is not a plausible profit-maximizing strategy for national wireless carriers. Were a small rural carrier to offer efficiencies in the provision of nationwide retail services, wholesale "duopolists" would compete to align with such a partner to better utilize their networks. This is precisely what is happening in wholesale markets today, as hundreds of roaming agreements have been executed between carriers large and small, with dozens of MVNOs developing niche markets. These latter retail market entrants buy billions of minutes in wholesale markets annually, markets in which foreclosure is said to be profitable for network owners. We turn to this evidence now.

2. *Empirical Evidence of Foreclosure.*

a. Prices.

Foreclosure is said to result from established national carriers restricting entry into nationwide retail services by small rural carriers. The emergence of the foreclosure problem, reversing previous claims – rural wireless carriers having opposed regulation of wireless roaming agreements in previous Commission proceedings[32] – is said to stem from consolidation of the national wireless market over the past five years.[33] The growing share of U.S. mobile phone subscribers and service revenues accounted for by the four national carriers has allegedly given these carriers the ability to restrain competition.

There is an unmistakable consolidation trend in the U.S. mobile phone market, but the question is whether this has produced, on net, efficiencies or inefficiencies. In the former case, consumers benefit, in the latter, they are harmed. The test suggested by the assertion made by proponents of regulation, then, is to examine retail prices and output during this period of consolidation. Where prices decline and output expands, evidence is gained that efficiencies are being achieved. To the contrary, price increases and output restriction suggest that additional market power is being asserted.

The path of retail prices, both for overall usage and for roaming, is strongly downward in the period dating from 1997-2005. As proxied by average revenue per minute of use (including long distance and monthly service charges), rates declined from 43.86¢ per minute of use (MOU) in December 1996 to 9.21¢ per MOU in December 2004.[34] Roaming charges fall even more precipitously, declining from an average of 59.50¢ per MOU in December 1996 to 5.51¢ in December 2004.[35] At the same time, output is increasing rapidly. Measured in MOUs per six-month interval, usage rises from 28.37 billion in December 1996 to 585.17 billion in December 2004. Roaming minutes increase, but not as rapidly as overall usage, from 2.46 billion in December 1996 to 39.83 billion in December 2004.[36] The relative reduction in roaming minutes is likely accounted for by the very consolidation under study: with the expansion in coverage areas of the national networks, roaming demand naturally contracts.

These data offer high level evidence that there is increasingly efficient organizational structure within the mobile phone sector, and that consumers are benefiting directly. Admittedly, these highly aggregated data could mask increments of output restriction emanating from anti-

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[32] "Rural providers should not be forced to enter into inequitable roaming arrangements with larger carriers in order to ensure that their customers can obtain the same favorable roaming rates that a large carrier may offer customers of other providers." See *Comments of the Rural Cellular Association*, CC Docket No. 94-54 (June 14, 1995), p. 8.

[33] "Over the last five years, nationwide carriers have grown increasingly dominant in the Commercial Mobile Radio Services ("CMRS") market and have used their power to make it ever more difficult for regional carriers—even innovative ones—to offer competitive roaming service." ERS Group 2005, p. 2.

[34] From 1996 to June 1998, revenues exclude long distance. From December 1998 and thereafter, revenues include long distance. Calculations based on CTIA Survey 2004 from file "CTIA.1985.2004.xls" (received on Dec. 29, 2005).

[35] Calculations based on CTIA Survey 2004 from file "CTIA.1985.2004.xls" (received on Dec. 29, 2005).

[36] Ibid.

competitive conduct. One might argue that even more impressive consumer gains would result were the rate control regime advanced by proponents of roaming regulation put in place.

But these data do effectively counter the regulatory argument put forward. That is because that argument is premised on two sets of alleged facts. The first is that consolidation within the industry has intensified over the past five years, and that this has changed industry dynamics sufficient to cause a re-evaluation of public policy. Where previously it was optimal to allow voluntary contracts to govern the roaming marketplace, market structure now requires regulation to protect competition. The second is that some rural wireless carriers are being offered wholesale rates that are asserted to be above their incremental costs. The latter, as shown above, is an incorrect and misleading way to characterize market power. And the former – the industry consolidation argument – is empirically countered by the price data.

The ERS paper states its case this way:

> In sum, over the last five years the CMRS market has seen increased consolidation leading to fewer nationwide carriers and increased concentration in the market share of those nationwide carriers. Although a majority of the population has the choice of five facilities-based carriers, a much smaller portion has access to six or more carriers, and in many areas consumers have only the four nationwide providers from which to choose. The significance of these facts will become clear upon examination of technological features of mobile wireless service.[37]

The discussion then moves to a discussion of rival wireless formats and wholesale pricing, avoiding any consideration of the direction of retail prices. This sidesteps the very issue at stake. The appropriate objective for public policy is consumer welfare maximization,[38] meaning that the observation that markets are consolidating – a structural change among firms – cannot be evaluated without observing the simultaneous trend in output markets. There, consumers are seen to reap large surplus gains due to lower prices. The assertion that industry consolidation mandates new regulations confronts not only a general challenge – how the aggregate data may be explained by alternative theories – but also the immediate paradox: Why do prices – direct consumer welfare metrics – rapidly decline in the face of this allegedly anti-competitive consolidation? It has been argued by economists[39] and by the FCC[40] that industry consolidation has helped *drive* the reduction in retail prices. The evidence that industry structure has changed, then, would appear considerably weaker as a premise for a policy recommendation than the evidence that consumer prices have dropped by 79%, and output increased by 1,963%.[41]

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[37] ERS Group (2005, p. 7).

[38] Gregory Rosston lucidly explains why this is so, and how this applies to the regulation proponents' arguments. In short, the policy advanced would deliver better terms to those firms arguing for regulation, while injuring consumers' interests in efficiency. See Gregory L. Rosston, *An Economic Analysis of How Competition Has Reduced High Roaming Charges*, filed with *Sprint Nextel Comments*, WT Docket No. 05-265 (Nov. 28, 2005).

[39] Hazlett 2003, pp. 193-202; Crandall 2005, pp. 94-109.

[40] See Hazlett 2003, pp. 234-35.

[41] Calculations based on CTIA's Semi-Annual Survey (2004) from file "CTIA.1985.2004.xls" (received on Dec. 29, 2005).

b. The wholesale market for roaming is competitive.

The observation that there are hundreds of successful roaming agreements currently in use among wireless carriers speaks to more than the *if it ain't broke, don't fix it* rejoinder to advocates for regulation. It sheds light on the theory of foreclosure advanced: if incumbent national wireless carriers benefit from anti-competitive conduct, denying efficiently-priced access to their networks, why do they enter into numerous contracts?

The number of roaming agreements signed by major carriers is large. Cingular has over 100 domestic roaming agreements.[42] T-Mobile, the other national GSM carrier, has 45 domestic roaming agreements.[43] The wholesale market for minutes, in which scores of roaming agreements are executed, does not suggest foreclosure.

In addition to roaming agreements, a robust wholesale market for network capacity has developed, giving life to abundant MVNOs. Table 1 lists these wholesale networks with the number of associated MVNOs, which now number at least 63.

TABLE 1: MVNOS IN THE UNITED STATES [1]

Carrier	*Number of MVNOs*
Alltel	1
BellSouth Mobility	1
Cingular	12
Nextel	2
Sprint	18
T-Mobile	1
Verizon Wireless	9
Unknown Network	19

[1] Source: "Takashi Mobile MVNO/SP List" at http://www.takashimobile.com/mvno.html (accessed Jan. 18, 2006).

Each party to a voluntarily negotiated contract captures gains from trade. Roaming agreements extended by national wireless networks to other carriers, as with wholesale contracts allowing MVNO subscribers to roam nationwide 'off-net,' yield voluminous evidence rejecting the foreclosure hypothesis. The question is, were it profitable to extend 100 roaming agreements to other carriers, or a dozen MVNO contracts, how can it be strategic to anti-competitively withhold the 101st roaming agreement? It is not plausible that an efficient, profitable contract for the national network could be rejected such that retail market share grows because the marginal entrant into the nationwide wireless market is now excluded.

[42] *Comments of Cingular Wireless LLC*, WC Docket No. 05-265 (Nov. 28, 2005), p. 11.

[43] *Declaration of James Martinek* (Nov. 28, 2005), p. 2, filed with Comments of T-Mobile USA, Inc., WT Docket No. 05-265, (Nov. 28, 2005).

c. Low cost technology shopping via multi-mode phones.

The idea that each technology market constitutes a separate market, and that the costs of switching from one technology to another are prohibitive, underpin the economic analysis of the regulation proponents. CDMA networks are said to operate in a distinct market from GSM networks, such that competition between them does nothing to constrain wholesale prices contained in roaming agreements.

This is empirically false for two reasons. First, carriers can negotiate around "lock-in" by contracting. This is how MVNOs enter the market, signing long-term agreements with wholesale service providers, exercising competitive options in their choice of long-term investments (including infrastructure and contracts). This is a standard means used by market transactors to avoid lock-in, yielding the opportunity to shop among competitive options. The flexibility is priced competitively, across the broader market where rival technologies vie against each other. In exchange for adopting a particular standard that may constrain future choices, firms receive payment in the form of lower access prices, partnership agreements, equity investments, or cooperative marketing deals. So "lock-in" becomes priced by a market that is competitive, using the ERS framework, but including a fundamental strategic margin well known to firms but omitted from their theory.

Second, even where a firm fails to avail itself of contractual protections from lock-in, it would continue to have future long-term contracts – from competitive inter-technology bidders – made available to it. The switching cost issue that would arise, as a migration from GSM to CDMA, or vice versa, would generally entail the employment of additional inputs. Specifically, the use of dual-mode phones would equip a given carrier's customers with the ability to roam onto networks using a distinct standard. The ERS and McAfee papers both recognize this possibility, but dismiss it as prohibitively expensive.

The evidence goes in the opposite direction. First, it is the case that many existing wireless telephone carriers utilize – or have utilized – multiple wireless technologies. Each unique standard deployed tends to raise the costs of infrastructure (including base stations) and handsets, but the advantages of multiple technologies have overwhelmed the disadvantages along important and fairly common margins. The original cellular networks, deploying an analog (AMPS) standard, have migrated tens of millions of subscribers over the past decade to digital handsets. Similarly, most carriers that chose TDMA for their first digital technology have migrated, or are in the process of migrating, to GSM or CDMA. These migrations are still ongoing and dual mode phones are widely used, specifically to *enable subscribers to roam nationwide*.

Multi-band, multi-mode phones do tend to add costs compared to simpler devices using a given technology over just one band. But to roam across multiple networks these more complicated handsets are actually more popular than the alternative. The added costs have been rewarded in access to better prices for equipment in input markets, analogous to the objective of a dual mode phone adoption for the purpose of obtaining better wholesale roaming rates.

The actual size of the price differential specific to dual mode phones can be seen in advertisements for such products. To use one example, Nextel's i930, a dual-mode phone (iDEN at 800 MHz for use in the U.S. and GSM 900/1800/1900 MHz for use internationally), costs $349.99 and Nextel's i870, a non-dual-mode phone, costs $299.99. The price difference is $50 per handset.[44] This is a small fraction of the cost of customer acquisition and retention, which totals about $680 per subscriber.[45] It is also smaller than the national carriers' average cost of spectrum per subscriber, which Robert Crandall estimates to be about $375[46]. If a $50 expenditure would allow a regional carrier to bypass the "foreclosure" of the "duopoly" wholesale market, bargaining for roaming rates in a competitive nationwide market, the value added would presumably far outweigh the $2 or $3 a month capital cost that an extra chip (yielding dual mode functionality) would cost.

d. National wireless carriers do not make supra-competitive returns.

Preston McAfee writes that wholesale rate regulation "only limits the ability of nationwide carriers to exercise market power to earn excess returns."[47] Yet, he offers no market evidence that national wireless carriers earn such profits. The assertion that wholesale prices charged to regional carriers exceed marginal costs, or other wholesale rates, does not constitute such evidence because other wholesale contract terms are omitted from the analysis and because the sunk network creation costs are not considered.

One test for market power would be to evaluate the q-ratios of wireless network owners. This was recently done by Robert Crandall, who found (using 2003 data from the three wireless pure plays then publicly listed, Sprint, Nextel, and AT&T Wireless), that average capital costs per subscriber were about $1,855, about the level of market valuation, on average, across the three firms.[48] This implies a q-ratio of approximately one, the level associated with a competitive rate of return.[49]

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[44] While the phones are similar, some other features may differ. It is not clear which would entail the most expensive (or valuable) attributes absent the dual mode differential. See the PhoneScoop website at http://www.phonescoop.com/phones/phone.php?p=803&printable and at http://www.phonescoop.com/phones/phone.php?p=627&printable (accessed on January 5, 2006); and Sprint Nextel website at http://nextelonline.nextel.com/NASApp/onlinestore/en/Action/DisplayPhones?audience=GENERAL_BUSINESS&id12=Business_Wireless;Phones&language=EN (accessed on January 18, 2006).

[45] Crandall 2005, p. 106. ERS cites customer acquisition costs only: "One of the biggest differences in wholesale and retail operating costs relates to customer acquisition expenses, which can exceed $350 per customer." ERS 2005, p. 11.

[46] Crandall 2005, p. 106.

[47] McAfee 2005, p. 17.

[48] Crandall found AT&T Wireless had a value-per-subscriber equal to nearly $2,000, Nextel about $2,800, and Sprint $1,400. Weighting by subscribers brings the mean to $2,046.23. Crandall 2005, p. 106.

[49] Supra-competitive rents could be capitalized in wireless license values. But Crandall finds that the average "spectrum" cost per subscriber equals $375, bounding this possibility. Moreover, although the evidence is scant, given the irregular nature of FCC license auctions, prices per-pop-per-MHz appear to have declined between January 2001 and mid-2005, the five-year period during which industry consolidation is alleged to have created market power. See website of CTIA – The Wireless Association, www.ctia.org.

IV. REGULATION OF RATES

a. The costs of rate regulation.

The imposition of rate controls for roaming services would inevitably entail costs. Regulation involves administrative processes, private expenditures on compliance, and the distortion of economic incentives. This is why, even in the face of substantial market power, price regulation may be an anti-consumer policy. This has proven to be the case with respect to rate regulation of cable TV systems, which has been shown to lower the quality of service sufficient to outweigh the pro-consumer effects of lower prices. In the instant case, there are no demonstrated benefits – in the form of lower prices for consumers – from regulation of wholesale prices in CMRS markets.

Indeed, U.S. regulators must – if considering policies to regulate roaming rates – familiarize themselves with the results of previous episodes in cellular telephone rate regulation. At both the retail and wholesale levels, state utility commissions were free to regulate rates prior to August 1994.[50] Those regulatory interventions were found to fail; rates were not lower, and may have been higher, in states that regulated cellular rates. To exclude an accounting of this empirical evidence is a fatal omission in the argument for regulation. As Charles Wolf, Jr. and others have shown,[51] to consider only the objectives of government intervention, ignoring the risks and costs, is to present a single-entry analysis of a double-entry problem.

Regulatory proponents state that simple rules can be used to implement rate regulation. National carriers would be mandated to offer other carriers the lowest rate offered to retail customers.[52] However, identifying this rate leaves room for substantial variance. This shows up in the filings made to the FCC, which provide ranges of 2.6 cents per minute to 5.0 cents per minute,[53] or 5.63 cents per minute to 6.83 cents per minute,[54] using calculations from the service menus of different national wireless carriers. Moreover, those menus, and pricing structures, change over time. And when the full complexity of pricing regimes in use in the retail marketplace – including unlimited use buckets for many types of voice and data services – is considered, the simple per-minute price targets suggested as appropriate for wholesale access rates disappear. A wide variety of prices appears, with the distribution changing over time.

With roaming rate regulation, carriers' interests diverge, and regulators are tasked with determining the optimal rate structure. This process is not simple. Prices set too low will

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[50] The Omnibus Budget Reconciliation Act (1993) pre-empted state regulation of cellular telephone rates pursuant to a one year phase-out, during which time the states could petition the FCC to request continuing rate regulation authority. Seven states filed to receive such authority; all were denied by the FCC. Hazlett 2003, p. 207.

[51] Charles Wolf, Jr., *Markets or Governments: Choosing Between Imperfect Alternatives* (MIT Press, 1989). A standard caveat is given in a popular economics textbook: "The coercive actions taken by government to compensate for the limitations inherent in purely voluntary cooperation are themselves subject to the same limitations. … Government is not the genie in Aladdin's lamp." Paul Heyne, Peter Boettke, and David Prychitko, *The Economic Way of Thinking*, 11th Edition (Prentice Hall, 2006), p. 328.

[52] "Where audited information is not publicly available about average retail rates, the cap should be set by the lowest prevailing retail rates for a particular area." ERS Group 2005, p. 24.

[53] McAfee 2005, p. 18.

[54] ERS Group 2005, p. 18.

discourage efficient investments in network infrastructure. Prices set too high will defeat the ostensible goal of the rate regulation. Because prices range widely, the use of existing rates simply begs regulatory determination of which rates, under what conditions at which times, should be used as a guide.

Two sets of costs immediately result. First, carriers engage in competitive actions to influence regulatory outcomes, a costly process of rent-seeking and rent-defending activity. Instead of devoting their resources to competing in the marketplace, firms are drawn to make investments in the political process. Second, resources of regulators are consumed, as government must engage in far-reaching determinations as to where the public interest lies. Decisions made previously in the marketplace are now made by government employees.

In addition, at least four uneconomic outcomes obtain. First, national wireless carriers will be given an incentive to raise rates, eliminating price discounts extended for on-net or off-peak calling, as well as low-cost offers extended to highly elastic demanders. This is the predictable consequence of mandating wholesale access at regulated rates set according to the retail prices posted by carriers. A national wireless network, under such a regime, finds that it can lessen its obligations by raising retail prices, particularly for its lowest-priced services.

Second, lowering wholesale roaming prices for certain carriers or resellers, the ostensible goal of regulation, provides a disincentive for the extension of facilities. This is the standard buy-or-rent trade-off; lowering rents raises the relative price of buying – i.e., building a network or network extension. This perverse outcome has been noted both by the FCC and rural cellular carriers: "The Commission is properly concerned that by permitting facilities-based CMRS providers to resell the facilities of competitors, the CMRS licensee that elects to resell may elect not to invest in the build-out of its service area."[55]

Third, should the FCC mandate a per-minute, rate-regulated access regime – the proposal put forward in the ERS and McAfee papers – it would undermine incentives for network construction by national wireless carriers. This is because in granting a naked right of access, it omits the possibility of negotiated quantity agreements, a key device whereby those sharing network facilities help limit the risks associated with their creation. Rural carriers again saw this as an important cost of rate regulation, fearing free riding on network investments: "Because it is not reasonable to require a carrier to provide service without reasonable assurance of the opportunity to recover its costs, a carrier that fulfills a reseller's request for service should be permitted: to require the reseller to guarantee the utilization of service for a reasonable period of time; to require the customer to provide a service deposit and/or service initiation fee; and to have the opportunity to increase rates for service, if necessary, prior to initiating service."[56]

Fourth, the process whereby regulators set wholesale roaming rates eliminates the alternative market-based process of negotiation. Under the current system, hundreds of agreements have been successfully executed, each one providing gains from trade. Moreover, there are large efficiency gains in the discovery of cooperative terms via the voluntary offers extended by either side to a roaming contract. In this marketplace, firms decide what makes

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[55] *Comments of the Rural Cellular Association*, CC Docket No. 94-54 (June 14, 1995), p. 11.

[56] Ibid., p. iii.

sense in terms of the technologies used for roaming functionality, coverage areas, quality of service guarantees, credit terms and customer service.

The table of contents of a generic contract used by Cingular to arrange roaming with other carriers is attached to this White Paper as Appendix A. The model, which is 76 pages long (including exhibits incorporated into the agreement) is the simplest used; more complex contracts are also in effect. By forcing parties together, not only are cooperative non-price gains unfulfilled, but also it is unknown what the efficient terms may be. The migration to regulation from market transactions could prove highly disruptive, precisely because mutually beneficial planning is lost. This was the argument made by the Rural Cellular Association, when it opposed roaming rate regulation before the FCC in 1995:

> There is no basis to provide resellers with a special mandated interconnection right. RCA submits that in the competitive CMRS market place, the decision of whether to offer reseller switch interconnection should be left to each competing CMRS provider.[57]

> In the absence of permitting a facilities-based carrier to condition the provision of services for resale in this manner, a facilities-based carrier could be inequitably forced to make imprudent investment in order to accommodate the business plans of a reseller who has no commitment to either investing in infrastructure or providing service to the public. The facilities-based carrier would additionally be exposed to the reseller's abandonment of the utilization of the network, leaving stranded investment that could only be recovered by increased rates to the public.[58]

Only in the context of reaching a voluntary roaming contract are the features of this cooperative relationship discovered, and only when parties possess the power to set wholesale rates can other terms and conditions be rationally priced. The net benefits alleged to flow from rate regulation cannot be properly evaluated without full consideration of such costs.

d. Experience with wholesale cellular rate regulation.[59]

Under the Omnibus Budget Reconciliation Act of 1993, state regulation of price and entry in the wireless market was pre-empted as of September 1, 1994. The event presented a natural experiment testing the effects of cellular rate regulation. If rate regulation benefited consumers, deregulation would presumably cause harm. This harm would be manifested in a reduction in the value of wireless services, and would be evidenced by a reduction in output adjusted for the underlying growth trend.

To test this proposition, one can observe market reactions following elimination of state-level rate regulation. With pro-consumer price controls limiting market power of cellular

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[57] *Comments of the Rural Cellular Association,* CC Docket No. 94-54 (June 14, 1995), p. iii.

[58] Ibid., p. 10.

[59] This section relies on Thomas W. Hazlett, *Regulating Wireless Phones in California: An Economic Analysis*, (Apr. 9, 2003).

operators, which then operated as duopolists, the removal of such controls would lead to substantial rate increases. Because quality may also be shifting, however, the key variable to observe is subscribership. Because subscribers take into account both price and quality, their willingness to purchase services should be a good indicator as to whether they believe that the value of wireless is becoming better or worse following deregulation.

Of course, other factors may also be changing beside the elimination of rate regulation. Fortunately, we have a control group which we can also observe – consumers in states where rate regulation was not imposed. By comparing growth rates in cellular penetration (subscribers per capita) across these two sub samples during the period in which rate regulation ends, we can infer whether consumers in states losing the benefit of rate regulation appear to become less willing to subscribe to cellular service. This would evidence itself in a declining growth rate for the regulated sample relative to the growth rate for the unregulated sample after federal pre-emption.

State penetration data are not available for the period in question, but penetration was recorded quarterly for the top ten U.S. markets during the early 1990s.[60] These markets display both substantial cellular usage and heterogeneity with respect to regulation. Four of the top ten markets were in states that regulated cellular rates: New York, Los Angeles, San Francisco, and Boston. The other six were unregulated: Chicago, Philadelphia, Detroit, Houston, Dallas, and Washington, D.C.[61]

The data suggest, in fact, that rate regulation was not able to improve consumers' position even partially. Cellular penetration was substantially higher in states that did not regulate rates prior to 1994. Many factors could account for this beside the regulatory difference, and so this intriguing relationship is left to be explained another day. What is seen in the analysis here is that subscribership does not decline in markets which were deregulated in September 1994 relative to the growth trend in unregulated markets. Instead of wireless customers losing valuable regulatory protection with federal pre-emption of rate regulation, growth rates in the deregulated markets rise, relative to the unregulated sample, in 1995, the first year post-regulation.

The experience offers basic, compelling evidence. If rate regulation had been succeeding, the markets which were protected by regulation should have exhibited relatively high subscriber penetration relative to unregulated markets, losing that advantage when the consumer protection mechanism was pre-empted. Yet, the most favorable interpretation that can be offered on behalf of rate regulation is that it does not appear to have had any effect.

This precedent is important in at least two dimensions. First, it appears to show that even when market power was evident in the existing cellular duopoly, rate regulation failed to improve consumer welfare. This demonstrates the point that the market failure is a necessary but insufficient condition to justify economic regulation. Second, it specifically underscores that theories about the efficacy of rate regulation of CMRS carriers should be subject to critical

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[60] *Data Flash: The Cellular Market Quarterly Review*, Quarterly Survey (Sept., 1996) Vol. 10, No. 4 Herschel Shoesteck and Associates, LTD (June 1997).

[61] Before the Public Utility Commission of the State of California, *Investigation on the Commission's Own Motion Into Mobile Telephone Service and Wireless Communications*, Decision 94-08-022 (Aug. 3, 1994), App. 2.

scrutiny. In filings made to the Federal Communications Commission, several states (including California, New York, and Arizona) predicted that with the end of state rate regulation, prices would rise and consumers would be harmed. Yet, state regulation was pre-empted. The facts show that the premise for regulation – that quality-adjusted rates would rise without it – was false, even when a plausible market power case could be made.

V. CONCLUSION

The U.S. wireless phone sector has produced enormous consumer welfare gains. During the past several years, entry has occurred, national networks have been created, and prices to consumers have plummeted. In particular, the cost of roaming has fallen dramatically, precisely because efficient networks have expanded in size and scope. A central part of this efficiency creation lies in the hundreds of roaming agreements that allow customers to seamlessly jump from one network to another, enjoying price reductions negotiated by their carriers.

The argument that wholesale rate regulation will improve consumer welfare is rejected by economic theory and the facts of the wireless marketplace. During the period in which consolidation has occurred, retail prices (including those paid for roaming services) have fallen precipitously. Moreover, networks have improved quality of service and geographic reach. Skyrocketing usage attests to the consumers' very positive verdict.

The foreclosure alleged by advocates of regulation is implausible. Rural wireless carriers dissatisfied with negotiated terms and conditions for roaming are not attempting to enter wholesale services where market power is alleged to exist. Moreover, the retail market that national carriers are alleged to protect is deemed by all parties to be competitive, meaning that foreclosure merely throws additional business to rival networks. And anti-competitive conduct in setting roaming rates (wholesale charges) for selected retail entrants will not harm consumers, as subscribers are free to switch to competitive entrants.

The retail wireless market is experiencing robust entry by MVNOs buying wholesale services in just the market alleged to be foreclosed. Between the hundreds of roaming agreements and scores of MVNO contracts now in effect in U.S. wireless markets, the highly competitive nature of the industry is vividly on display.

Proponents of regulation suggest that wholesale prices be capped based on various formulas for per-minute charges, avoiding other contractual terms. To grant a retailer the ability to buy minutes one at a time is to artificially eliminate a panoply of contract terms that are key components of efficiency – as attested to in early filings by the rural wireless carriers themselves. In negotiating terms for exchanging traffic, carriers set terms for jointly providing services. Such agreements do not simply set per-minute prices, but coordinate technologies, customer service, quantities of use and other important factors that help networks to be cost-effectively created, maintained, and operated.

To eliminate this rich source of market efficiency is to replace markets that are working with an argument for regulation that fails to even consider the costs of such action and has

suggested no plausible source of social benefit. The impressive gains being produced by competitive forces in the wireless telephone sector are not likely to be improved on by such a change in policy.

APPENDIX A

INTERCARRIER MULTI-STANDARD ROAMING AGREEMENT
BY AND BETWEEN
CINGULAR WIRELESS LLC
AND
[INSERT CARRIER NAME][62]

[NOTE: THIS IS A FORM THAT IS DESIGNED TO BE CUSTOMIZED FOR BUSINESS DIFFERENCES AMONG CARRIERS; ONLY SOME OF THE APPROPRIATE CUSTOMIZATIONS ARE NOTED (IN BRACKETS). THE PERSON MAKING THE CHANGES TO THE WORD VERSION OF THIS DOCUMENT SHOULD BE FAMILIAR WITH THE FOLLOWING FEATURES OF WORD: (1) USE OF HEADINGS; (2) AUTOMATED CROSS-REFERENCES, (3) UPDATING THE TABLE OF CONTENTS BASED ON HEADINGS (VS. TC CODES) AND (4) UPDATING FIELDS.]

**[This version applies to a Carrier that
Is NOT entitled to Preference
and
Is NOT a member of the GSM Alliance]**

[62] From file "Form MSRA NP+NA (08 24 2005)-v1.doc (received on January 19, 2006).

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